2006
Wayne National Forest
Emerald Ash Borer
Survey

Equipment needed:

- GPS unit or Hammerhead Tablet.
- Maps and datasheets.
- Binoculars
- Hatchet
- Collection vials and alcohol
- Flagging

About the plan:

This plan was created using Wayne National Forest (WNF) data. Sample sites were chosen by WNF personnel. The areas chosen were all recreational sites that are used for or have been used for overnight camping. Since firewood is considered the primary mode of movement for this insect this was seen as the most likely location for introduction. Future assessments will center on targeted surveys of other potential points of introduction.

About the insect:

Emerald ash borer (EAB) (Buprestidae: *Agrilus planipennis*) is an exotic pest of ash (*Fraxinus* spp.). Feeding by the larval stage of this beetle occurs in the inner bark and phloem. Larval feeding damages a trees ability to move food and water leading to crown dieback and decline. Trees die after several years of repeated attacks. Attacks can occur on small (1-2 inch diameter) to large diameter trees. Newly infested trees may appear healthy and have no visible symptoms of attack. Detection of EAB in these trees is difficult. More established infestations, those with larvae present for 1-3 years, are likely to be associated with dead and declining trees and visible signs of infestation, including thin crowns, vertical bark splits, dead and dying branches and epicormic sprouting. D-shaped exit holes can be found the year after the initial attacks. Woodpecker activity on a tree can indicate an infestation. Because first-year infestations can be difficult to ascertain, visual surveys that target older infestations are more likely to be successful. This can be accomplished by focusing on declining and recently killed ash trees. If EAB populations have been established in an area for several years, local ash decline and tree mortality are likely. Traps and attractants for adults are not yet available.

Figure 1. ***Emerald ash borer larvae and adult (http://www.michigan.gov/mda.html)***

The purposes of this plan are to:

- Locate any existing EAB infestations.
- Identify and survey the most likely areas for EAB introduction and establishment.
- Provide a format for reporting and recording both positive and negative EAB detections

When to look:

Many of the signs of EAB infestation (D-shaped exit holes, bark splits and winding galleries) can be observed at any time of the year. However, dead and declining trees can be most easily observed during the growing season. Fall coloration can mimic crown decline. Therefore, the best time periods for visual surveys are from June through mid-September.

Where to look:

Inspections can be done from the ground since attacks occur from the ground level up into the crown of trees.

What to look for:

Ash tree identification:

1) Branches opposite (Figure. 2) –
2) Compound leaves, 5 to 9 leaflets, smooth or finely toothed around outer edge.

Figure 2. ***Alternate vs opposite branching*** ***Simple vs compound leaves.(leaflets)***

Determining ash species:

Differentiating between the four species of ash that are commonly found isn't easy. However, there are some characteristics that will help you determine which ash you are examining.

White Ash
(Fraxinus Americana)

White ash is an upland tree, with little tolerance for growing in wet areas. Two of the differentiating characteristics between it and the other ashes are the scar that a fallen leaf leaves behind and the leaflets color. The leaf scar on white ash has more of a V shaped to it than do the other ashes (Figure 3) and the leaflets are whitish beneath.

Figure 3. ***White ash, V-shaped leaf scar.***

Green Ash
(Fraxinus pennsylvanica)

Green ash can be found in a wide variety of sites, but its usual habitat is poorly drained soils, usually along streams, in bottom lands, and throughout wet woods. When comparing the leaf scar of green ash to that of white, the scar on green ash appears be more like an oval with a flat line across the top (Figure 4).

Figure 4. ***Green ash bud and leaf scar.***

Black Ash
(Fraxinus nigra)

Black ash is a smaller tree than either white or green ash, commonly reaching 40 to 50 feet in height. Like green ash, black ash's native habitat is that of more poorly drained sites, such as swamps, streams, and riverbanks. The terminal buds are more black when compared to the brown of either green or white ash (Figure 5).

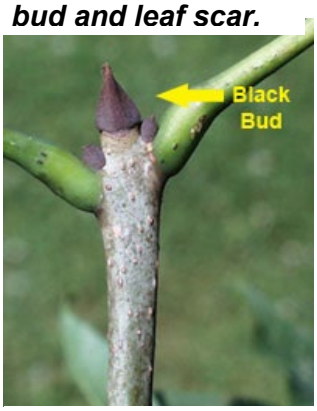

Figure 5. ***Black ash bud***

Blue Ash
(Fraxinus quadrangulata)

Blue ash is commonly found on dry upland limestone sites. It is considered a medium-sized tree with the distinctive characteristic of having twigs that appear to be square. The wings that grow on the twigs give the tree its square twig-identifying characteristic (Figure 6). The bark of blue ash is shaggier in appearance than any of the other three ashes described here.

Figure 6. . ***Left, blue ash bud, and right, square twig.***

EAB identification:

Look closely at the bark surface for the presence of D-shaped exit holes and vertical bark splits, (Figure 7). Exit holes can be easily observed on younger trees with smooth bark but can be more difficult to locate on older trees with rough bark. If present, they will occur on the main stem and branches larger than 1-2 inches in diameter. Vertical bark splits are another sign of EAB attack. These characteristic splits in the bark range in size from 2-5 inches. The wood surface is often visible below with S-shaped

galleries etched on the surface. Another thing to look for is the presence of metallic green beetles. If beetles are found, it is important that you collect and preserve them in alcohol. Woodpecker activity that has removed patches of bark can be another sign of an EAB infestation. If possible, remove a portion of the bark and look for evidence of winding S-shaped galleries on both the inner bark surface and the outer wood surface and cream-colored larvae. Again if present, please collect and preserve larvae in alcohol.

Figure 7. ***D-shaped exit holes, vertical bark splits and S-shaped frass filled galleries of the Emerald Ash Borer.***

How many trees to examine:

A minimum of 10 ash trees at each site should be closely examined for the presence or absence of EAB. These trees should be ash trees that show symptoms of ash decline and dieback, and ash trees that have died within the last 1-2 years. Decline and dieback symptoms include: • Epicormic sprouts on the main stem • Dead or dying branches in the upper crown • Yellow or off-color foliage during the growing season. If no declining trees are found inspect ash trees with no signs or symptoms of decline. Recording apparently healthy trees is recommended so that a record of visual survey locations is maintained.

How to look:

Identify the survey site from the maps included in this booklet. You will see that each site has been outlined with a 50 foot buffer (Figure 8). This is the area that is to be surveyed. For each site you will fill out the Emerald Ash Borer Visual Survey Form include in this booklet. Walk transects through the buffer areas and document on the form the location, density and condition of ash at the site. For the 10 individual ash tree survey I would like you to flag and label each tree as "EAB survey inspection tree and number" and mark the locations on the map. Fill out the form for each of these trees and provide any addition notes that you feel are appropriate.

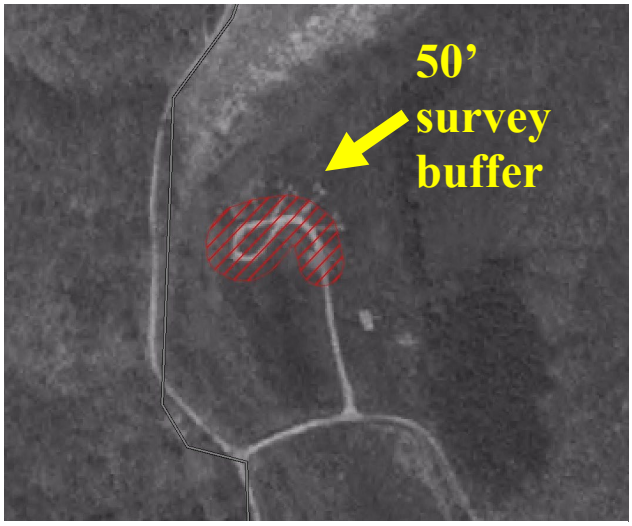

Figure 8. ***Aerial photograph of campground with a fifty foot survey buffer.***

If you encounter any situations or have any questions, give me a call at the office (304) 285-1544, cell (304) 376-2951, or at home (304) 594-3353.

Future criteria for selecting survey sites:

Several areas have been identified as potential points of introduction . These areas include:

1) Nurseries that sell or broker ash trees;
2) Hunting cabins and seasonal residences,
3) Hardwood sawmills that use ash,
4) Commercial firewood dealers;
5) New housing and commercial developments where ash may have been recently planted;

More information:

Printed and electronic images of signs and symptoms of EAB infestation are available at: http://www.na.fs.fed.us/spfo/pubs/pest_al/eab/eab.pdf, an EAB field guide is also available at: http://www.fs.fed.us/na/morgantown/fhp/eab/eabfg.pdf.